AF/1742

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	APECS INVESTMENT CASTINGS PTY. LTD.)	Examiner:	SHEEHAN, J.
Serial Number:	08/637802)	Art Unit:	1742
Filed:	5/8/96)		
For:	SILVER ALLOY COMPOSITIONS)		
Docket Number:	4999)		

#27 PK 11/13/00

COMMUNICATION

Hon. Commissioner of Patents
And Trademarks
Washington, D.C. 20231

November 1, 2000

Sir:

In response to the PTO communication dated October 26, 2000, enclosed herewith are three copies of the Appeal Brief and the Declaration as filed on August 16, 2000.

Enclosed also is a copy of the USPTO communication for your reference.

Appellant respectfully requests further consideration of the present appeal brief on the merits.

Respectfully submitted,

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, on November 1, 2000.

Erin E. Weinner

UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

SERIAL NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NO.
08/637,801	05/08/96	ECCLES A	C-35467

IM62/1026

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EXAMINER	
SHEEHAN J	
ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 10/26/00

Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents

1. The appeal brief filed on August 22, 2000 is defective because the three copies of the brief required under 37 CFR 1.192(a) have not been submitted.

To avoid dismissal of the appeal, appellant must submit the necessary additional copies of the appeal brief within the longest of any of the following TIME PERIODS: (1) ONE MONTH or THIRTY DAYS, whichever is longer, from the mailing of this communication; (2) within the time period for reply to the action from which appeal has been taken; or, (3) within two months from the date of the notice of appeal under 37 CFR 1.191. Extensions of these time periods may be granted under 37 CFR 1.136.

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner John P. Sheehan, whose telephone number is (703)-308-3861. The examiner can normally be reached on Tuesday-Friday from 6:30 A.M.-5:00 P.M.

The fax phone number for this Technology Center is (703)-305-3599.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0651.

When filing a FAX in Technology Center, please indicate in the Header (upper right) "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communication with the PTO that are not for entry into the file of the application. This will expedite processing of your papers.

jps
October 25, 2000

John P. Sheehan
Primary Examiner
Art Unit 1742

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	)		
	)		
ECCLES, Anthony Phillip	)	Examiner:	John P. Sheehan
	)		
Serial No.: 08/637,802	)	Art Unit:	1742
	)		
Filed: May 8, 1966	)		

For: SILVER ALLOY COMPOSITIONS

Attorney Docket No.: C35469

APPEAL BRIEF

Hon. Commissioner of Patents
and Trademarks
Box AF
Washington, D. C. 20231

August 16, 2000

Sir:

This is an appeal from the final rejection by the Examiner dated November 16, 1999. A "Notice of Appeal" was timely filed by Applicant on February 16, 2000.

I. PARTY OF INTEREST

The present patent application was assigned to Apecs Investment Castings Pty. Ltd. ("Apecs") of 17 Harker Street, Burnwood, Victoria 3125, Australia. Inventor Anthony Phillip Eccles assigned all his right, title and interest in the present invention to Apecs on April 25, 1996. The present Assignment was recorded in the US PTO on June 18, 1996.

II. RELATED APPEALS AND INTERFERENCES

The present patent application is not related to any other appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-4, 6-15, and 17-23 presently stand rejected pending appeal. Claims 5 and 16 have been withdrawn from consideration.

IV. STATUS OF AMENDMENTS

Applicant has not filed any amendments to the claims after the Examiner's final rejection of pending Claims 1-4, 6-15, and 17-23, dated November 16, 1999.

V. SUMMARY OF THE INVENTION

The present invention is directed toward silver copper alloy compositions exhibiting superior fire scale resistance, improved work hardenability over known fire scale resistant silver copper alloys, increased cast hardening and an expanded fluidity range resulting in a product that resists cracking and solidifies in a more uniform manner. Page 2, lines 27-35 of the specification discloses a range of silver alloy compositions claimed in independent claim 1 as comprising, by weight, at least 86% silver, 0.5-5.5% copper, 0.07-6% mixture of zinc and silicon, wherein the silicon is present in the range of 0.02-2.0% and 0.01-2.5% germanium. Each elemental additive of the complex silver alloy compositions of independent claim 1 modifies the resulting silver alloy. As a result, the complex interplay of each additive to the silver alloy compositions of claim 1, results in the compositions exhibiting characteristics suitable for practical jewelry making. Characteristics such as superior fire scale resistance, a long fluidity range, excellent cast hardening and an improved work hardenability over known fire scale resistant silver copper alloys, are vital to the applicability of the silver alloy compositions of claim 1 to the jewelry and material products industry.

Claims 2-4 and 6 depend from claim 1 and further limit the concentration range of silver, copper, zinc, and germanium respectively, to more preferred embodiments. Dependent claims 2-4 and 6 are disclosed on page 2 lines 35-36 through page 3 lines 1-31 of the specification. Claims 7-10 also depend from claim 1 and further include additives such as indium, boron and tin in the silver alloy compositions of claim 1, providing for more preferred embodiments, and limit the concentration ranges of each new additive to more

preferred embodiments. Dependent claims 7-10 are disclosed on page 3 lines 32-36 through page 4 lines 1-9 of the specification.

Independent claims 11, 12 and 17-20 specify further the concentrations of the elements in the embodiments of the silver alloy compositions taught in dependent claims 7-10. Claims 11, 12 and 17-20 are disclosed on page 4 lines 10-26 of the specification.

Method claims 13-15 and 21-23 teach methods of producing the silver alloy compositions of claims 1, 7 and 9. Claims 13-15 and 17-20 are disclosed on page 5 lines 1-36 through page 6 lines 1-13 of the specification.

VI. ISSUE

Whether trace amounts of germanium added to the complex silver alloy compositions of claims 1-4, 6-15 and 17-23 is non-obvious under 35 USC Sec. 103(a) and patentable over *Bernhard et al.* U.S. Patent No. 5,039,479 in view of *Rateau* et al. GB 2,255,348?

VII. GROUPING OF CLAIMS

Claims 1-4, 6-15 and 17-23, rejected under 35 USC Sec. 103(a) as unpatentable over *Bernhard et al.* in view of *Rateau* et al, do not stand or fall together.

VIII. ARGUMENT

The silver copper alloy compositions as broadly claimed in independent claim 1, and more narrowly claimed in claims 2-4, 6-12 and 17-20, are comprised of complex combinations of elements that chemically react to produce silver alloys that exhibit many desirable features. The silver alloys taught by claims 1-4, 6-12 and 17-20 exhibit superior fire scale resistance, improved work hardenability over known fire scale resistant silver alloys, excellent cast hardening and a long fluidity range that produces alloys which resist cracking and solidify in a uniform manner. Method claims 13-15 and 21-23, teach methods for producing the silver copper alloy compositions of claims 7-10, which exhibit the superior fire scale resistance, improved work hardenability, excellent cast hardening and long fluidity ranges as discussed above.

The silver copper alloy compositions of independent claim 1 are complex physicochemical substances containing metals and metalloids, as well as elements in solid solution and precipitated phases. The silver copper alloy compositions of independent claim 1 comprise, by weight, 0.5 - 5.5% copper, 0.07 - 6% mixture of zinc and silicon, wherein

the silicon is present in the range of 0.02 - 2%, 0.01 - 2.5% germanium and at least 86% silver. Base metals, silver and copper, are combined with additives, zinc and silicon, resulting in a complex alloy containing non-metals and metalloids that do not behave the same as metals. Trace amounts of germanium are alloyed to the complex combination of the base metals plus additives, resulting in an alloy exhibiting physical and chemical properties dramatically altered from the original base metals plus additives complex.

Zinc and silicon of claim 1 act to deoxidize the silver alloy compositions during the melting process, thus producing superior fire scale resistant silver alloys. The trace amounts of germanium added to these superior fire scale resistant silver alloy compositions of claim 1, act to increase the work hardenability of the alloys over known fire scale resistant silver alloys. This translates into silver alloys that continue to increase in hardness as they are worked, such as when the alloys are stamped or drawn into wires.

The trace amounts of germanium also provide excellent cast hardening of products forged with the silver alloy compositions of claim 1, and increases the fluidity range of the alloy. This expanded fluidity range allows the alloy to remain in a liquid state longer and fill in cracks forming in the solidifying silver, thus yielding an alloy that solidifies harder and in a more uniform manner when cast. Casting includes the process of filling molds with liquid silver alloy to reveal the intricate and complex shapes and designs that make up each mold. The expanded liquid phase of the compositions of claim 1 also allow the silver to more completely fill all the intricacies and complexities of the entire mold, thus avoiding void formations in the resulting cast products.

It is believed that the trace amounts of germanium remain in solid solution during post-melt processing rather than sacrificially consumed in an oxidation process, thereby enabling the resulting silver alloys to exhibit the combination of increased work hardenability, excellent cast hardness, and expanded fluidity range as discussed above. These benefits make the silver alloy compositions of Claim 1 particularly suitable for jewelry making and specifically for casting jewelry, as well as for casting material products. These industries, for example, manufacture rings, pendants, and products having complex or three-dimensional shapes.

There is no teaching or suggestion of the silver alloy compositions of claim 1 in the *Bernhard* and *Rateau* references considered as a whole. The combination of *Bernhard* and *Rateau* do not teach the addition of trace amounts of germanium to a complex silver

alloy comprised of metals and non-metals or metalloids. Both *Bernhard* and *Rateau* deal only with the problem of increasing the fire scale resistance of a silver-copper alloy. *Bernard* does not teach nor suggest the use of germanium at all, and *Rateau* teaches only the use of large quantities of germanium in a silver-copper alloy comprised of only the two base metals silver and copper. It is improper for the Examiner to combine only parts of the *Rateau* reference, namely, the disclosure of germanium, to the *Bernard* reference in order to achieve claim 1 of the present invention, without considering the teachings of *Rateau* as a whole. As a whole, *Rateau* teaches adding germanium to a silver-copper alloy comprised only of two base metals, and does not teach the addition of germanium to a complex silver alloy composition comprised of metals and non-metals.

Likewise, the claimed invention must also be considered as a whole and not just as individual elements lumped together. The proper analysis is not the difference between references *Bernard* and *Rateau* that would have been obvious, but whether the claimed invention as a whole would have been obvious. *Stratflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983). The Examiner cannot disregard the claimed invention as a whole, which is complex silver alloy compositions comprised of metals and non-metals exhibiting superior fire scale resistance, increased work hardenability over known fire scale resistant alloys, excellent cast hardness and an expanded fluidity range.

It is well known that the addition of an alloying metal to a base metal composition which contains other additives, some non-metals and some metalloid that behave as non-metals, may not necessarily have the same result as the addition of the same alloying metal to the base metal alone without additives. Likewise, the effects of adding trace amounts of germanium to a complex tertiary alloy containing additives/metalloids zinc and silicon, as well as base metals silver and copper, cannot be predicted by the addition of germanium to an alloy containing only base metals silver and copper without metalloids or additives. The alloying of metalloids and inclusion of non-metals into a base metal, is a much more complex chemical reaction than the alloying together of only metals which predominantly form a solid solution. Accordingly, the addition of germanium to the silver copper alloy of *Rateau* does not predict the behavior of germanium added to a complex silver, copper, zinc and silicon alloy. The addition of silicon and zinc into the base metals silver and copper, introduces levels of complexity that do not exist with solid solution metals as taught by *Rateau*.

Rateau's disclosure that the addition of germanium results in the formation of GeO/GeO_2 helices with reducing potential, and that the alloys are of improved hardness, does not predict that the addition of germanium to the complex silver, copper, zinc and silicon

alloy would result in an alloy with the multiple properties of superior fire scale resistance, long fluidity range and increased work hardenability and cast hardness over the starting metals. This lack of predictability is particularly prevalent with complex alloys, where minor variations in additives can have major effects on the resulting alloys' physical and chemical properties, as stated in the attached Declaration of Melvin Bernhard.

Additionally, *Rateau* teaches the use of large amounts of germanium as a replacement for silicon and other elements known to have deoxidization properties in order to increase the fire scale resistance of the silver-copper alloy comprised of only those two base metals. *Rateau*, on Page 3, lines 27-29 of the specification, teaches away from the use of silicon in silver alloy compositions because, according to *Rateau*, silicon is insoluble in silver and thus gives rise to alloys that are brittle to varying degrees. As a result, *Rateau* specifically teaches the replacement of additives such as silicon, with large amounts of germanium in order to increase the fire scale resistance of the silver alloy, rather than teaching the use of germanium used in combination with more complex silver alloy compositions containing non-metals such as silicon. Independent claim 1 is believed allowable over cited references Bernhard and *Rateau* for the reasons as stated above.

Claims 2-4 and 6 depend from independent Claim 1 and further limit the concentration ranges of silver, copper, zinc and germanium respectively, to more preferred embodiments. Claims 2-4 and 6 are believed allowable for the same reasons as stated for independent Claim 1.

The silver copper alloy composition of dependent claim 7 further includes an additive selected from a group consisting of indium, boron, and a mixture of indium and boron. The additive is included in a concentration of up to 3.5% by weight. In addition to the arguments presented above for independent claim 1, applicant has submitted objective secondary evidence of the commercial success of the silver alloy compositions of dependent Claim 7, as further evidence of the non-obviousness and patentability of the silver alloy compositions of dependent Claim 7 over cited references Bernhard and *Rateau*. Objective secondary evidence of commercial success of the silver alloys of dependent claim 7, due to the superiority of the alloys to the contemporaneous art is proof of the non-obviousness of claim 7 over the cited art. "Recognition by the trade is the best and most persuasive evidence that can be offered." In Re James R. Tiffin et at., 58 C.C.P.A. 1277, 443 F.2d 394 (Appellants proof of commercial success succeed in overcoming the 103 rejection of the claim).

The objective secondary evidence of the commercial success of the silver alloys of claim 7 is submitted in an attached Declaration of Melvin Bernhard under Rule 132, properly executed on August 14, 2000. Objective evidence of commercial success for years 1995-1998 is also of record in prior Declarations of Melvin Bernhard submitted on September 16, 1998 and September 2, 1999. The attached Declaration under Rule 132 executed by Melvin Bernhard attests to the following facts as set forth below.

Melvin Bernhard established the United Precious Metal Refining Co. Inc. ("United Precious Metal") in1987 and incorporated the Company in 1988. Melvin Bernhard is currently the Vice President of United Precious Metal, an officer and director of the corporation, and has been in charge of Research and Development for the company since February 2, 1988. United Precious Metal is the largest privately owned supplier of jewelry grade metal alloys in the United States, and manufactures $48 million worth of metal alloys each year for the jewelry and material products market. United Precious Metal is currently an exclusive licensee of the above-referenced patent application that was assigned to Apecs Investment Castings Pty. Ltd. ("Apecs"). A copy of the license agreement is attached as Exhibit A.

Presently, United Precious Metal is using the current invention to manufacture an "Apecs sterling silver alloy" composition comprising, by weight, 92.5% silver, 4.83% copper, 2.25% zinc, 4.2% silicon, 0.1% indium, and 0.12% germanium, and an "Apecs master alloy" composition to be combined with silver, comprising, by weight, 64.4% copper, 30% zinc, 0.26% silicon, 0.13% indium and 0.16% germanium. The "Apecs sterling silver alloy" is produced, manufactured, and sold by United Precious Metal under the brand name "Sterling Ag #57". The "Apecs sterling silver alloy" and "Apecs master alloy" currently sold by United Precious Metal are embodied in claim 7 of the present patent application. Further discussion of the commercial success of these two alloys will be discussed below with reference only to the "Apecs sterling silver alloy", which accounts for almost all of sales of these two combined alloys.

The "Apecs sterling silver alloy" has increased the sales of sterling silver alloys for United Precious Metal by 250% since 1994, the first year of the license of the present patent application. United Precious Metal sold about 400,000 troy ounces of sterling silver in 1994, and only five years later, United Precious Metal sold nearly 1,000,000 troy ounces of sterling silver in 1999, as seen in Exhibits G & H. The "Apecs sterling silver alloy" currently accounts for nearly 65% of the total sterling silver alloy sold by United Precious Metal in 1999, accounting for sales of 636,521 troy ounces of "Apecs sterling silver alloy" in 1999. Further sales of "Apecs sterling silver alloy" amounted to 610,641 troy ounces

sold in 1998, 495,837 troy ounces sold in 1997, 423,442 troy ounces sold in 1996, 242,250 troy ounces sold in 1995, and 160,043 troy ounces sold in 1994, as also seen in Exhibit G.

The "Apecs sterling silver alloy" is the single biggest selling alloy of United Precious Metal, but not a majority of their business. To put the above commercial success of the "Apecs sterling silver alloy" into perspective, approximately 10 million troy ounces of sterling silver alloy are sold in the United States every year, and the jewelry casting and material products industry represents about 25-30% of the entire sterling silver alloy market. The one million troy ounces of sterling silver alloy currently sold per year by United Precious Metal, is sold exclusively to the jewelry casting and material products industry. As a result, United Precious Metal captures 1/3 of the total sterling silver alloy sales to the jewelry casting and material products industry.

Although the ultimate determination of patentability is based on the entire record, evidence of commercial success, and the opinion of one of ordinary skill in the art must be considered when they are presented. In Re Chilowsky, 306 F.2d 908; 134 USPQ 515 (CCPA 1962). Melvin Bernhard is certainly qualified as one skilled in the art of silver alloys, based on his 25 years experience selling and manufacturing commercial silver alloys, and his status as an inventor of two US Patents Nos. 4,973,446 and 5,039,479 both Bernhard et al., granted for silver alloy compositions, in 1990 and 1991 respectively. US Patent No. 5039,479 to Bernhard et al. is a cited reference against the present patent application.

Melvin Bernhard has stated in his attached Declaration, that the silver copper alloys of the Bernhard '479 patent have serious problems with their relatively soft consistency. Although these silver alloys exhibit superior fire scale resistance, the consistency of these alloys is too soft for many practical jewelry making applications, seriously limiting the use of these alloys. Bernhard also stated that the when comparing the silver alloys of Bernhard'479 to the "Apecs sterling silver alloy", the minor variations in additives incorporated into the "Apecs sterling silver alloy" had dramatic chemical and physical effects in the resulting end product.

According to the Bernhard Declaration, the "Apecs sterling silver alloy" became the preferred alloy of choice by United Precious Metal customers, soon after its introduction in 1994. The commercial success of the "Apecs sterling silver alloy" is due to the beneficial characteristics the alloy displays, mainly its superior fire scale resistance, its excellent cast hardening, its long fluidity range and its increased work hardenability over

known fire scale resistant alloys. As stated in the attached Declaration of Melvin Bernhard, these characteristics are particularly sought after by United Precious Metal customers that are mainly manufactures of cast jewelry.

The commercial success of the "Apecs sterling silver alloy" is even more impressive when considering that it is a more expensive product than the other silver alloys sold by United Precious Metal. The "Apecs sterling silver alloy" is at least 25 cents more expensive per troy troy ounce. An increase of at least 25 cents per troy ounce is significant in the industry, because silver alloys are seen as commodity raw materials and sells for only about $6.00 per troy ounce. An increase in only a few cents can price a silver alloy right out of the market.

It is well known that germanium is an expensive element, however, since only trace amounts of germanium are incorporated into the "Apecs sterling silver alloy", the alloy can still be sold at a reasonable price, even if it is higher than the other silver alloys sold by United Precious Metal. In contrast, some of the silver copper germanium alloys taught by *Rateau* utilize almost 5x the germanium concentration as in the "Apecs sterling silver alloy" to achieve the results taught by *Rateau*. The large amounts of germanium taught by *Rateau*, would increase the cost of the product by 20-30% over traditional commercial silver copper alloys, as stated in the attached Declaration of Melvin Bernhard. In Melvin Bernhard's opinion, this dramatic cost increase of the silver copper germanium alloys taught by *Rateau*, would negate any real commercial value of these alloys.

No increase in advertising was conducted for the "Apecs sterling silver alloy" over the other silver alloys sold by United Precious Metal. Melvin Bernhard has stated that to the best of his knowledge, the "Apecs sterling silver alloy" was marketed in the normal way they introduce any new alloy, by advertising it only in their product brochures alongside their other silver alloys. For example, there was one color add in a national magazine that ran periodically, advertising the "Apecs sterling silver alloy". This same advertising was done for the earlier silver alloys as well.

According to the terms of the license agreement as seen in Exhibit "A", United Precious Metal has paid to Apecs a down payment of $9,000 and royalties of 10¢ per troy ounce of "Apecs sterling silver alloy" sold in 1994 to the present, and 25¢ per troy ounce of Apecs master alloy sold in 1994 to the present. Currently, to date, royalties paid by United Precious Metal to Apecs total $269,299.00. On a yearly basis, according to a fiscal year of July1-June 30,United Precious Metal has paid Apecs $16,004.00 in 1995,

$25,225.00 in 1996, $43,413.00 in 1997, $59,665.00 in 1998, $62,355.00 in 1999, $64,994.00 in 2000, and $5,691.00 so far in 2001, as seen in Exhibits B-F, respectively. United Precious Metal can cease any and all royalty payments to Apecs upon the abandonment for non-issuance of the present patent application, according to the terms in Paragraph 4 of the license agreement as seen in Exhibit "A".

The Examiner made many references to Melvin Bernhard as an interested party in the present patent application, but never really expanded from there on what weight should be given to Bernhard's Declaration, and his opinion as one skilled in the art. As a licensee of the present patent application, even as an exclusive licensee, it may be argued that Bernhard is somewhat of an interested party, however, United Precious Metal possesses "the kind of interest [that] adds to rather than detracts from the weight to be accorded the affidavit, so long as the licensing relationship is bona fide and was entered into at arms length" Tiffen, at 1285. There is no evidence that the license agreement between United Precious Metal and Apecs is anything by an arms length agreement that benefits both parties.

United Precious Metal is paying a substantial sum of money in royalties to Apecs, so far $269,299.00. United Precious Metal is currently selling the "Apecs sterling silver alloy" at a markup, to cover the cost of paying royalties to Apecs. As discussed above, the "Apecs sterling silver alloy" sells for 25 cents more per troy ounce than the other sterling silver alloys sold by United Precious Metal. Part of the 25 cent increase charged for the "Apecs sterling silver alloy" includes the royalty fee markup.

Additionally, United Precious Metal is currently doing very well selling the "Apec sterling silver alloy", without any patent protection, even at a marked up price to cover royalty fees. It can easily be seen that United Precious Metal can make more money on the "Apecs sterling silver alloy" if was never patented, making Bernhard much less of an interested party as alluded to by the Examiner. Without patent protection for the "Apecs sterling silver alloy", competitors can also sell the "Apecs sterling silver alloy", but United Precious Metal can cease making royalty payments and thus sell the "Apecs sterling silver alloy" at a lower price and potentially increase their volume of sales.

The commercial success of the "Apecs sterling silver alloy" comprising, by weight, 92.5% silver, 4.83% copper, 2.25% zinc, 0.2% silicon, 0.1% indium, and 0.12% germanium is supported in the attached declaration of Marvin Bernhard, and along with arguments and opinions of declarant as presented above is evidence of the patentability of Claim 7 separate from the remaining claims of the present patent application.

Claims 8-10 depend from claim 1 and further include additives such as mixture of indium and boron, and tin to the silver alloy compositions of claim 1, providing for more preferred embodiments. Dependent claims 8-10 are believed allowable for the same reasons as stated for claim 1.

Independent claims 11, 12 and 17-20 specify further the concentrations of the elements in the embodiments of the silver alloy compositions taught in dependent claims 7-10. Claims 11,12 and 17-20 are believed allowable for the same reasons as stated for claim 1.

Method claims 13-15 and 21-23 teach methods of producing the silver alloy compositions of claims 1,7 and 9. Claims 13-15 and 21-23 are believed allowable for the same reasons as stated for claim1.

IX. APPENDIX

1. Fire scale resistant, work hardenable jewelry silver alloy compositions comprising:

0.5-5.5% by weight copper;

0.07-6% by weight of a mixture of zinc and silicon, wherein said silicon is present in the range of 0.02 to 2.0% by weight;

0.01-2.5% by weight germanium; and

at least 86% by weight silver.

2. Fire scale resistant, work hardenable jewelry silver alloy compositions in accordance with Claim 1, including silver in a content of at least 92.5% by weight.

3. Fire scale resistant, work hardenable jewelry silver alloy compositions in accordance with Claim 1, including a copper content in the range of from 2.0 to 3.0% by weight.

4. Fire scale resistant, work hardenable jewelry silver alloy compositions in accordance with Claim 1, including a zinc content between 2.0 and 4.0% by weight.

6. Fire scale resistant, work hardenable jewelry silver alloy compositions in accordance with Claim 1, including a germanium content in the range of 0.04 to 2.0% by weight.

7. Fire scale resistant, work hardenable jewelry silver alloy according to claim 1, further comprising an additive in a concentration of up to 3.5% by weight, said additive selected from the group consisting of indium, boron, and a mixture of indium and boron.

8. Fire scale resistant, work hardenable jewelry silver alloy compositions in accordance with claim 7, wherein said mixture of indium and boron comprises up to 2% by weight boron and up to 1.5% by weight indium.

9. Fire scale resistant, work hardenable jewelry silver alloy according to claim 1, further comprising tin in an amount of up to 6% by weight.

10. Fire scale resistant, work hardenable jewelry silver alloy compositions in accordance with claim 9, wherein the tin content ranges from 0.25 to 6% by weight.

11. Silver alloy compositions comprising:

81 - 99.409% by weight silver;
0.5 - 6% by weight copper;
0.05 - 5% by weight zinc;
0.02 - 2% by weight silicon;
0.001 - 2% by weight boron;
0.01 - 1.5% by weight indium, and
0.01 - 2.5% by weight germanium.

12. Silver alloy compositions comprising:

75 - 99.159% by weight silver;
0.5 - 6% by weight copper;
0.05 - 5% by weight zinc;
0.02 - 2% by weight silicon;
0.001 - 2% by weight boron;
0.01 - 1.5% by weight indium;
0.01 - 2.5% by weight germanium, and
0.25 - 6.0% by weight tin.

13. A method of producing fire scale resistant, work hardenable jewelry silver alloy compositions according to Claim 1, and including the alloying of silver metal with a master alloy comprising: 52.5 - 99.85% by weight copper;0.1 - 35% by weight of a mixture of zinc and silicon, and 0.05 - 12.5% by weight germanium.

14. A method of producing fire scale resistant, work hardenable jewelry silver alloy compositions according to claim 7 and including the alloying of silver metal with a master alloy comprising: 15.0 - 99.545% by weight copper; 0.25 - 25% by weight zinc; 0.1 - 10% by weight silicon; 0.005 - 10% by weight boron; 0.05 - 15% by weight indium, and 0.05 - 25% by weight germanium.

15. A method of producing fire scale resistant, work hardenable jewelry silver alloy compositions according to Claim 9 and including the alloying of silver metal with a master alloy comprising: 2.5 - 97.455% by weight copper; 0.25 - 25% by weight zinc; 0.1 - 10% by weight silicon; 0.005 - 10% by weight boron; 0.05 - 15% by weight indium; 0.05 - 25% by weight germanium, and 2.0 - 12.5% by weight tin.

17. A silver composition comprising:

92.5 silver by weight percent;
2.35 Copper by weight percent;
2.82 Zinc by weight percent;
0.19 Silicon by weight percent;
0.01 Boron by weight percent;
0.23 Indium by weight percent;
1.9 Germanium by weight percent.

18. A silver composition comprising:

92.5 Silver by weight percent;
3.25 Copper by weight percent;
3.75 Zinc by weight percent;
0.2 Silicon by weight percent;
0.01 Boron by weight percent;
0.25 Indium by weight percent;
0.04 Germanium by weight percent.

19. A silver composition comprising:

92.5 Silver by weight percent;
3.0 Copper by weight percent;
3.14 Zinc by weight percent;
0.15 Silicon by weight percent;
0.01 Boron by weight percent;
0.2 Indium by weight percent;
1.0 Germanium by weight percent;

20. A silver composition comprising:

2.25 Zinc by weight percent;
0.075 Indium by weight percent;
0.075 Tin by weight percent;
0.125 Germanium by weight percent.

21. A method of producing fire scale resistant, work hardenable jewelry silver alloy compositions having at least 86% by weight silver, comprising the steps of:

a) providing a master alloy comprising copper, zinc, silicon, and germanium;

b) alloying silver metal with the master alloy, maintaining a silver alloy composition of at least 86% by weight silver, 0.5 - 5.5% by weight copper, 0.07 - 6% by weight of a mixture of zinc and silicon wherein said silicon is present in a range of 0.2 - 2% by weight, and 0.01 - 2.5% by weight germanium.

22. A method of producing fire scale resistant, work hardenable jewelry silver alloy compositions having at least 86% by weight silver, comprising the steps of:

a) providing a master alloy comprising copper, zinc, silicon, born, indium and germanium.

b) alloying silver metal with the master alloy, maintaining a silver alloy composition of at least 86% by weight silver, 0.5 - 5.5% by weight copper, 0.07 - 6% by weight of a mixture of zinc and silicon wherein said silicon is present in a range of 0.2 - 2% by weight, 0.01 - 2.5% by weight germanium, and up to 3.5% by weight an additive including a mixture of indium and boron.

23. A method of producing fire scale resistant, work hardenable jewelry silver alloy compositions having at least 86% by weight silver, comprising the steps of:

a) providing a master alloy comprising copper, zinc, silicon, boron, indium, germanium and tin.

b) alloying silver metal with the master alloy, maintaining a silver alloy composition of at least 86% by weight silver, 0.5 - 5.5% by weight copper, 0.07 - 6% by

weight of a mixture of zinc and silicon wherein said silicon is present in a range of 0.2 - 2% by weight, 0.001 - 2.5% by weight germanium, up to 3.5% by weight an additive including a mixture of indium and boron, and up to 6% by weight tin.

SUBMITTAL OF APPEAL BRIEF FEE

Submitted herewith is a check for $150 to cover the cost of submitting the present Appeal Brief.

REQUEST FOR EXTENSION OF TIME

Appellant respectfully requests an extension of time from the normal term from which to file an appeal brief, for four months, from April 16, 2000 to August 16, 2000. Submitted herewith is a check for $680 to cover the cost of the extension. Any deficiency or overpayment should be charged or credited to Deposit Account No. 04-2219, referencing our Docket No. 4999.

Respectfully submitted,

SUSAN M. KEATING
Attorney For Appellant
Registration No. 41,887

ORUM & ROTH
53 West Jackson Boulevard
Chicago, Illinois 60604-3606
Telephone: (312) 922-6262
FAX: (312) 922-7747

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D. C. 20231, on August 16, 2000.

Patricia A. Mohr

Patricia A. Mohr

LICENSE AGREEMENT

AGREEMENT made this .....15th..... day of .....July....., 1994, by and between Apecs Investment Castings Pty. Ltd. ("Apecs"), incorporated in Victoria, Australia, and having a principal place of business located at 17 Harker Street, Burwood, 3125, Victoria, Australia, and United Precious Metal Refining, Inc. ("UPMR"), a New York corporation, having a place of business located at 2781 Townline Road, Alden, New York, 14004.

WITNESSETH THAT:

WHEREAS, Apecs has developed a class of improved silver alloys collectively known as "APECS 925 STERLING SILVER" (hereinafter "the alloys") and master alloys therefor; and

WHEREAS, Apecs has applied for an International Patent Application designating the United States in respect of the alloys, a copy of said application and its specification being attached hereto as Schedule A; and

WHEREAS, Apecs is desirous of granting a right and license to UPMR under the terms and conditions set forth herein; and

WHEREAS, UPMR is desirous of acquiring such right and license under the terms expressed herein;

NOW, THEREFORE, in consideration of the sum of One Dollar ($1,00) and other good and valuable consideration each to the other in hand paid, the receipt whereof is hereby acknowledged, the parties hereto do mutually agree as follows:

1. Apecs hereby represents and warrants that it has developed the alloys disclosed and claimed in said patent application; that it has filed the subject application before the International Bureau and designating the United States; and that it has the right, free of any and all liens and encumbrances, to grant this license to UPMR.

2. Apecs hereby grants to UPMR an exclusive right and license to practice (i.e. to make, use or sell) the invention defined by each and every valid claim of said application, any divisional or continuation application filed in respect of an invention disclosed in said application, and any US patent that may be granted therefrom in respect of said application or divisional or continuation application, and to cause third parties to practice the invention on its behalf by way of subcontract, as well as the right to sublicense the rights conferred by this agreement. The license granted to UPMR is limited to the territory for which a United States Patent extends, and has no extra-territorial effect. Any sublicence granted under this agreement will be notified to APECS within 30 days of the execution thereof.

3. The license granted herein shall be exclusive. However, in the event that UPMR shall sell less than:

50,000 troy ounces during the first year
100,000 troy ounces during the second year
200,000 troy ounces during the third year
300,000 troy ounces during the fourth year and subsequent years,

then Apecs shall have the right and option to convert this license from an exclusive license to a non-exclusive license. Minimum performance in respect of this exclusive license shall amount to any one of:-

(a) sales as specified above;

(b) payment of the royalty payable on that amount of alloys whether sold or not, and does not include any amounts of alloy sold by a sublicensee under this agreement.

As used herein, "troy ounce" means troy ounces of said alloys. Where sales of master alloys which may be converted to equivalent quantities of said alloys are made, the quantity of master alloys is accounted for in accordance herewith by multiplying the master alloy quantity by 2.5.

4. UPMR shall pay to Apecs:

(1) the sum of US$9,000.00 within 30 days from the date of execution hereof, and

(2) a royalty of US$0.10 per troy ounce of alloy falling within the scope of any claim of said application or any US patent issuing therefrom, and US$.025 per troy ounce of master alloy produced for the purpose of producing said alloys, together with any royalty payable in respect of alloy or master alloy produced by any sublicensee under this agreement.

However, UPMR shall not be obligated to pay royalties to Apecs:-

(A) from the date that the United States National Phase of said application is abandoned without continuation, division or issue, or

(B) if the product made by UPMR falls outside the scope of any valid claim of said application, continuation, or divisional applications or any patent issuing in respect thereof.

Royalty rate may be varied as may be agreed in writing between the parties hereto pursuant to representation made one to the other of grounds for variation of the royalty rate above, except that the foregoing royalty rate shall apply at least up until the date of that representation.

5. The term of this agreement shall continue through the last to expire of any US Patent issuing in respect of an invention defined in said application, or claiming the benefit of its priority date.

6. UPMR shall keep accurate books and records, and shall render to Apecs calender-quarterly reports of alloy produced and sales made, and the greater of royalty due or minimum performance payment due. Such quarterly reports and payments are due within thirty days following the close any calendar quarter. The first full quarter's report and payment shall be constituted for the period extending from the date of this agreement to the expiry of that quarter. UPMR shall grant Apecs, or its designee, the right and access to such books and records, during normal business hours, for the purpose of

verifying the information contained in the reports.

7. To the extent possible, UPMR shall mark its goods with the number of any United States patent granted from or claiming priority from said application.

8. UPMR shall have the right to sue for infringement of any patent granted in respect of the invention and shall have the right to keep the proceeds of any such suit to itself to offset the cost of prosecuting the suit, except insofar as a court may award damages or an account of profits in excess of the cost of prosecuting the suit, in which case Apecs shall be entitled to such of that excess as would have been payable by way of royalty on the alloys produced in infringement of the patents.

9. This agreement, and the license granted herein, shall inure to the benefit of any successor or assign of the entire business of either party, except that the license shall not be assigned, transferred or set over, by either party hereto without the express written consent of the other party, which consent will not be unreasonably withheld or the veto provided hereby exercised in breach of any legislation under which this provision must be construed.

10. This agreement may, at the option of an aggrieved party hereto, be terminated on the ground of a breach of a term or condition hereof, provided that the breaching party is provided with a reasonable opportunity to rectify that breach. In no case shall this agreement be terminated in accordance with this provision unless the aggrieved party has notified the other party in writing of the breach and provided therein a term of not less than thirty (30) days for
(1) rectification of the breach, or
(2) agreement to arbitration in respect of the breach.

11. This agreement, entered into willingly by both parties, expresses the entire agreement and understanding between them. The terms and provisions of this agreement may be

changed or modified only by a written instrument, duly executed by an officer of each party, and shall be changed or modified on agreement of the parties to (merge and incorporate any prior agreement between them).

12. Arbitration of this agreement shall be undertaken between a representative patent attorney or lawyer appointed by and acting for each of the parties. Where the matter cannot be arbitrated in this manner, the representatives shall mutually appoint an umpire, whose decision shall be binding to the parties.

13. This agreement shall be construed in accordance with the laws of the State of New York. Any dispute in relation to construction of the terms and conditions of this agreement and in particular any dispute arising out of changes and modification of this agreement in accordance with paragraph 11 shall be arbitrated.

IN WITNESS WHEREOF, the parties have here unto cause this document to be executed by their duly authorized corporate officers as of the above date.

APECS INVESTMENT CASTINGS PTY. LTD.

.....
KATHRENE ANN ECCLES
Managing Director

APECS INVESTMENT CASTINGS PTY. LTD. A.C.N. 004 914 612 ☆ THE COMMON SEAL OF

.....
ANTHONY PHILIP ECCLES
Director

UNITED PRECIOUS METAL REFINING, INC.

.....
MEL BERNHARD
Director

EXHIBIT B

Fiscal Year 1997

30-Jun-97		Sales for APECS Royalty			Year 3				Year 3		30-Jun-97		Sales for APECS Royalty			Year 3
									200,000							
		St. Ag 57	Comm.	Quarterly	Quarterly	Quantity	Quarterly		Year 4+				S-57 Alloy	Comm.	Quarterly	Quarterly
Date		T/oz	$0.10	Comm.	Total T/oz.	Needed	+/- T'oz	Due 6/97	300,000		Date		T/oz	$0.25	Comm.	Total T/oz.
Jul-96		17,641	$1,764								Jul-96		-	$0		
Aug-96		31,274	$3,127								Aug-96		-	$0		
Sep-96		36,639	$3,664	$8,555	85,554	50,000	35,554				Sep-96		503	$126	$126	503
Oct-96		44,266	$4,427								Oct-96		52	$13		
Nov-96		33,951	$3,395								Nov-96		600	$150		
Dec-96		35,643	$3,564	$11,386	113,960	50,000	63,860				Dec-96		(22)	($6)	$158	630
Jan-97		38,426	$3,843								Jan-97		9	$2		
Feb-97		34,517	$3,452								Feb-97		1,033	$258		
Mar-97		28,949	$2,895	$10,189	101,892	50,000	51,892				Mar-97		131	$33	$293	1,173
Apr-97		37,531	$3,753								Apr-97		158	$40		
May-97		42,868	$4,287								May-97		600	$150		
Jun-97		41,737	$4,174	$12,214	122,136	50,000	72,136				Jun-97		1,210	$303	$492	1,968
Total	1997	423,442	$42,344			200,000	223,442	(223,442)			Total		4,274	$1,069		4,274
	1996	242,250														

EXHIBIT C

Fiscal Year 1998

30-Jun-98		Sales for APECS Royalty			Year 4				Year 4		0-Jan-00		Sales for APECS Royalty			Year 4
									300,000							
		St. Ag 57	Comm.	Quarterly	Quarterly	Quantity	Quarterly						S-57 Alloy	Comm.	Quarterly	Quarterly
Date		T/oz	$0.10	Comm.	Total T/oz.	Needed	+/- T'oz	Due 6/98			Date		T/oz	$0.25	Comm.	Total T/oz.
Jul-97		26,916	$2,692								Jul-97		1,150	$288		
Aug-97		53,347	$5,335								Aug-97		700	$175		
Sep-97		48,153	$4,815	$12,842	128,416	75,000	53,416				Sep-97		104	$26	$489	1,954
Oct-97		48,295	$4,830								Oct-97		501	$125		
Nov-97		34,406	$3,441								Nov-97		110	$28		
Dec-97		24,586	$2,459	$10,729	107,287	75,000	32,287				Dec-97		90	$23	$175	701
Jan-98		41,125	$4,113								Jan-98		-	$0		
Feb-98		34,812	$3,481								Feb-98		1,207	$302		
Mar-98		39,984	$3,998	$11,592	115,921	75,000	40,921				Mar-98		1,096	$274	$576	2,303
Apr-98		49,897	$4,990								Apr-98		1,387	$347		
May-98		50,388	$5,039								May-98		636	$159		
Jun-98		43,928	$4,393	$14,421	144,213	75,000	69,213				Jun-98		1,343	$336	$842	3,366
Total	1998	495,837	$49,584			300,000	195,837	195,837			Total		8,324	$2,081		8,324
	1997	423,442														

EXHIBIT D

Fiscal Year 1999

30-Jun-99		Sales for APECS Royalty			Year 5				Year 5		0-Jan-00		Sales for APECS Royalty			Year 5
									300,000							
		St. Ag 57	Comm.	Quarterly	Quarterly	Quantity	Quarterly						S-57 Alloy	Comm.	Quarterly	Quarterly
Date		T/oz	$0.10	Comm.	Total T/oz.	Needed	+/- T'oz	Due 6/98			Date		T/oz	$0.25	Comm.	Total T/oz.
Jul-98		37,906	$3,791								Jul-98		1,227	$307		
Aug-98		49,198	$4,920								Aug-98		293	$73		
Sep-98		42,016	$4,202	$12,912	129,120	75,000	54,120				Sep-98		334	$84	$464	1,854
Oct-98		55,250	$5,525								Oct-98		200	$50		
Nov-98		61,247	$6,125								Nov-98		110	$28		
Dec-98		62,065	$6,207	$17,856	178,562	75,000	103,562				Dec-98		220	$55	$133	530
Jan-99		47,633	$4,763								Jan-99		195	$49		
Feb-99		45,620	$4,562								Feb-99		2,590	$648		
Mar-99		43,345	$4,335	$13,660	136,598	75,000	61,598				Mar-99		1,617	$404	$1,101	4,402
Apr-99		73,086	$7,309								Apr-99		1,384	$346		
May-99		45,190	$4,519								May-99		522	$131		
Jun-99		48,085	$4,809	$16,636	166,361	75,000	91,361				Jun-99		470	$118	$594	2,376
Total	1999	610,641	$61,064			300,000	310,641	310,641			Total		9,162	$2,291		9,162
	1998	495,837														

EXHIBIT E

Fiscal Year 2000

30-Jun-00		Sales for APECS Royalty			Year 6				Year 6		0-Jan-00		Sales for APECS Royalty			Year 6
									300,000							
		St. Ag 57	Comm.	Quarterly	Quarterly	Quantity	Quarterly						S-57 Alloy	Comm.	Quarterly	Quarterly
Date		T/oz	$0.10	Comm.	Total T/oz.	Needed	+/- T'oz	Due 6/00			Date		T/oz	$0.25	Comm.	Total T/oz.
Jul-99		50,609	$5,061								Jul-99		110	$28		
Aug-99		59,071	$5,907								Aug-99		620	$155		
Sep-99		59,312	$5,931	$16,899	168,992	75,000	93,992				Sep-99		1,350	$338	$520	2,080
Oct-99		66,411	$6,641								Oct-99		241	$60		
Nov-99		60,059	$6,006								Nov-99		130	$33		
Dec-99		44,026	$4,403	$17,050	170,496	75,000	95,496				Dec-99		1,115	$279	$372	1,486
Jan-00		64,007	$6,401								Jan-00		400	$100		
Feb-00		33,292	$3,329								Feb-00		215	$54		
Mar-00		47,392	$4,739	$14,469	144,691	75,000	69,691				Mar-00		510	$128	$281	1,125
Apr-00		49,588	$4,959								Apr-00		100	$25		
May-00		49,707	$4,971								May-00		323	$81		
Jun-00		53,048	$5,305	$15,234	152,342	75,000	77,342				Jun-00		53	$13	$119	476
Total	2000	636,521	$63,652			300,000	336,521	336,521			Total		5,167	$1,292		5,167
	1999	610,641														

EXHIBIT F

Fiscal Year 2001

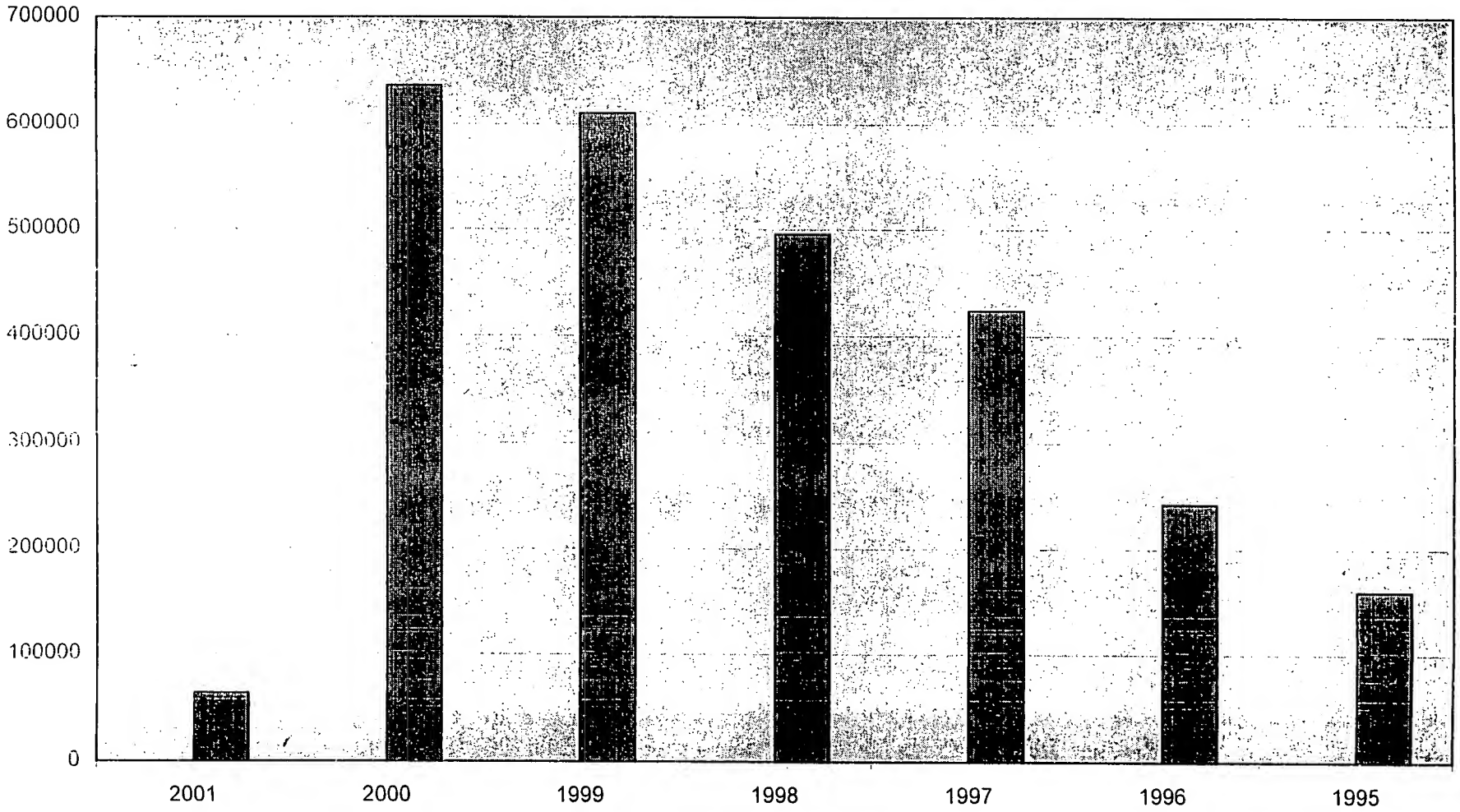
9-Aug-00		Sales for APECS Royalty			Year 7				Year 7		0-Jan-00		Sales for APECS Royalty			Year 7
									300,000							
		St. Ag 57	Comm.	Quarterly	Quarterly	Quantity	Quarterly						S-57 Alloy	Comm.	Quarterly	Quarterly
Date		T/oz	$0.10	Comm.	Total T/oz.	Needed	+/- T'oz	Due 6/01			Date		T/oz	$0.25	Comm.	Total T/oz.
Jul-00		50,515	$5,051								Jul-00		130	$33		
Aug-00		12,828	$1,283								Aug-00		-	$0		
Sep-00		-	$0	$6,334	63,343	75,000	(11,657)				Sep-00		-	$0	$33	130
Oct-00		-	$0								Oct-00		-	$0		
Nov-00		-	$0								Nov-00		-	$0		
Dec-00		-	$0	$0	-	75,000	(75,000)				Dec-00		-	$0	$0	-
Jan-01		-	$0								Jan-01		-	$0		
Feb-01		-	$0								Feb-01		-	$0		
Mar-01		-	$0	$0	-	75,000	(75,000)				Mar-01		-	$0	$0	-
Apr-01		-	$0								Apr-01		-	$0		
May-01		-	$0								May-01		-	$0		
Jun-01		-	$0	$0	-	75,000	(75,000)				Jun-01		-	$0	$0	-
Total	2001	63,343	$6,334			300,000	(236,657)	(236,657)			Total		130	$33		130
	2000	636,521														

EXHIBIT G

Total Sterling Silver Alloy Troy Ounces

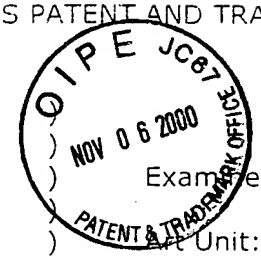
4-Aug-00			Sterling								
	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990
JANUARY	91,782	71,624	60,588	69,609	37,284	39484	28276	32137	17,084	16,400	3,000
FEBRUARY	59,562	76,832	52,717	54,654	43,780	28230	26283	23607	15,457	16,995	3,332
MARCH	86,190	87,702	63,677	74,821	36,770	41074	32809	27138	17,619	15,384	6,128
APRIL	79,292	111,273	68,550	77,234	44,783	31200	39102	26168	29,597	14,247	5,566
MAY	76,718	70,003	73,243	71,608	48,318	37250	31770	29760	39,998	15,427	11,986
JUNE	86,069	71,906	68,473	123,723	76,314	40303	32895	26283	46,304	21,903	12,707
489,340											
JULY	84,532	73,646	55,188	51,005	40,465	23001	19353	19456	29,746	24,113	9,440
AUGUST	10,793	90,784	71,121	101,762	54,276	39130	35687	22420	33,434	14,569	8,310
SEPTEMBER		88,906	65,713	79,899	63,909	42280	44657	30654	32,621	25,407	11,351
OCTOBER		91,448	83,141	71,653	75,726	47305	37499	34339	27,159	26,238	14,265
NOVEMBER		85,332	84,788	66,025	56,308	50516	42204	29018.53	26,541	14,636	20,965
DECEMBER		66,027	80,037	42,549	54,426	27697	27315	23028	39,353	13,069	10,833
496,143											
6 MONTHS	479,613	489,340	387,248	471,649	287,249	217541	191135	165093	166,059	100,356	42,719
TOTAL	574,939	985,483	827,236	884,542	632,359	447470	397850	324008.53	354,913	218,388	114,883
Apecs Sterling Silver	2000	1999	1998	1997	1996	1995	1994				
Alloy #57											
Troy Ounces	56,914	636,521	610,641	495,837	423,442	242,250	160,043				

Apecs Sterling Silver Alloy
Troy Ounces
Exhibit H



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



In re application of

Applicant: **ECCLES**, Anthony Philip

Serial No.: 08/637,802

Filed: May 8, 1996

For: SILVER ALLOY COMPOSITIONS

Attorney Docket No.: 4999

Examiner: John P. Sheehan

Art Unit: 1742

DECLARATION UNDER RULE 132

Hon. Commissioner of Patents
and Trademarks
Box AF
Washington, D. C. 20231

Date: August 14, 2000

I, Melvin Bernhard, established United Precious Metal Refining Co. Inc. (United Precious Metal), on June 10, 1987, and incorporated United Precious Metal in 1988. I am the Vice President of United Precious Metal, and have been an officer, director, and in charge of Research and Development, since February 2, 1988. I am also an inventor for two U. S. Patents granted for silver copper alloys that have been assigned to United Precious Metal as discussed below.

United Precious Metal is the largest privately owned supplier of jewelry grade metal alloys in the United States. United Precious Metal manufactures 48 million dollars worth of metal alloys each year for the jewelry and material products market, and is an innovative developer of new metallic alloys. United Precious Metal has been assigned two U. S. Patents for silver alloy compositions, namely, U. S. Patent No. 4,973,446 to *Bernhard et al.* in 1990 and U. S. Patent No. 5,039,479 to *Bernhard et al.* in 1991.

I am familiar with the above-referenced patent application, as well as with the development, usage and properties of silver copper alloys for use in the manufacture of jewelry and other fine silver applications.

BACKGROUND INFORMATION

To the best of my recollection, sterling silver, near sterling silver, and other high silver concentration alloys have been commercially manufactured for the jewelry, house ware and minting industries for centuries, and have been available on a wide scale since at least the beginning of this century. Fire scale resistant sterling silver alloys first appeared in the industry in 1970. Many new compositions of these high silver content alloys have been manufactured over the years in order to fulfil particular needs. Minor variations in additives that chemically react with the high silver concentration alloys can have dramatic chemical and physical effects in the end product. Elements such as nickel, cadmium, zinc, and silicon have been used over the years as additives to silver rich silver copper alloys in order to improve the fire scale resistance of the alloys which will undergo heat treatment during post melt processes, as required during jewelry making, etc. Some of these additives are still used today.

United Precious Metal owns two U. S. patents as discussed above, which have advanced the company's manufacture and sale of its sterling silver alloy compositions. The '446 and "479 patents teach jewelry grade and other high silver content silver alloy compositions exhibiting superior fire scale resistance as is desirable for fine silver applications such as in the jewelry, house wares, flatware, and minting industries. The '446 and '479 *Bernhard* patents teach silver alloy compositions comprising, by weight, at least 89% silver, 0.01-2% silicon, 0.001-2% boron, 0.5-5% zinc, 0.5-6% copper, 0.25-6% tin and 0.01-1.25% indium. The silver alloy compositions of the '446 and '479 patents have had serious problems with their relatively soft consistency. The consistency of these alloys is too soft for practical jewelry making, seriously limiting the use of these alloys.

United Precious Metal, as early as September 1990, fully appreciated that it had an interest and desire to increase the hardness of its superior fire scale resistant sterling silver alloy, to a level akin to standard silver alloys used for jewelry making. Although United Precious Metal possessed the means and motivation to increase the work hardenability of its fire scale resistant silver alloys disclosed in the '446 and '479 patents, United Precious Metal was unable on their own, to find an acceptable way to increase the work hardenability of these fire scale resistant sterling silver alloys.

In early 1993, at a Santa Fe symposium, I attended a meeting with Anthony Philip Eccles of Apecs Investment Castings Pty. Ltd. (Apecs). I was familiar with Anthony Eccles' work in incorporating silicon additives into precious metals, and asked his assistance in reviewing the problems associated with increasing the work hardenability of our patented sterling silver alloys disclosed in the '446 and '479 patents.

Anthony Eccles developed a new silver alloy composition as disclosed in Claim 1 of the present patent application comprising, by weight, at least 86% silver, 05-5.5% copper,

0.07-6% mixture of zinc and silicon, wherein the silicon is present in a range of 0.2-2%, and 0.01-2.5% germanium.

Anthony Eccles had discovered that by adding trace amounts of germanium to the high-silver, low-copper, silver copper alloys of the '479 patent, the germanium, as it is believed, would remain in solid solution during post melt processing thereby increasing the work hardenability of the alloy over other fire scale resistant silver alloys. The trace amounts of germanium were also shown to increase the fluidity range of the alloy, allowing the alloy to stay liquid longer in order to fill any cracks forming in the solidifying silver, resulting in an alloy that solidified in a more uniform way when cast. This increased fluidity range also increased the alloys resistance to void formation in the resulting cast products because of the expanded solidification time, allowing the alloy to properly fill the entire mold. The sterling silver alloy as disclosed in Claim 1 of the present patent application had the properties sought after by United Precious Metal and was capable of passing rigorous acceptance tests, including tests for appearance, fire scale resistance, work hardenability, and usefulness and suitability for jewelry manufacturing.

United Precious Metal was delighted to be advised of the successful development of the sterling silver alloys of Claim 1 in the present application, and was sufficiently confident in these alloys, such that United Precious Metal entered into a license agreement with Apecs on July 15, 1994.

LICENSE AGREEMENT BETWEEN UNITED PRECIOUS METAL AND APECS INVESTMENT CASTINGS PTY. LTD.

United Precious Metal is currently an exclusive licensee of the above-referenced patent application that was assigned to Apecs. A copy of the license agreement is attached as Exhibit A. United Precious Metal is presently using the claimed invention to manufacture an "Apecs sterling silver alloy" composition comprising, by weight: 92.5% silver; 4.83% copper; 2.25% zinc; 0.2% silicon; 0.1% indium and 0.12% germanium, and an "Apecs master alloy" comprising, by weight, 64.4% copper, 30% zinc, 0.26% silicon, 0.13% indium and 0.16% germanium. United Precious Metal began selling the "Apecs sterling silver alloy" in 1995, the first full year of the license of the above patent application, and continues to manufacture and sell the alloy under the brand name "Sterling AG #57". The "Apecs sterling silver alloy" has enjoyed a wide degree of acceptability in the market place for its desirable silver color, overall appearance, fire scale resistance, sufficient work hardenability for practical jewelry making, and its expanded fluidity range, providing an alloy particularly desirable for the jewelry casting industry. The degree of acceptability of the "Apecs sterling silver alloy" is demonstrated by our customers willingness to purchase

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this alloy in large quantities, at a price significantly greater than our other sterling silver alloys, as discussed below.

According to the terms of the license agreement, United Precious Metal has paid to Apecs a down payment of $9,000, and royalties of 10¢ per troy ounce of "Apecs sterling silver alloy" sold in 1995 to present, and 25¢ per troy ounce of "Apecs master alloy" sold in 1995 to present. Royalties were paid quarterly to Apecs according to a fiscal year of July 1 to June 30, and currently to date, United Precious Metal has paid Apecs $269,299.00 in royalties. United Precious Metal has paid fiscal yearly royalties to Apecs in the amount of $16,004.00 in 1995, $24,225.00 in 1996, $43,413.00 in 1997, $51,665.00 in 1998, $63,355.00 in 1999, $64,944.00 in 2000, and $5,691.00 so far in 2001, as seen in Exhibits B-F respectively. (Individual documentation for years 1995 & 1996 are not available)

United Precious Metal could cease any and all royalty payments to Apecs upon the abandonment for non-issuance of the present patent application, according to the terms in paragraph 4 of the license agreement, as seen in Exhibit A.

COMMERCIAL SUCCESS

Approximately 10 million troy ounces of sterling sliver alloy are sold in the United States every year, and the jewelry casting and material products industry represents about 25-30% of the entire sterling silver alloy market. United Precious Metal currently sells one million troy ounces of sterling silver alloys to the casting industry, capturing 1/3 of the total casting industry market.

The "Apecs sterling silver alloy" is our single biggest selling alloy, though not a majority of our business. We sell the "Apecs sterling silver alloy" exclusively to the jewelry casting and material products industry. This industry manufactures for example rings, pendants and products having a complex or three-dimensional shape. Casting of these products includes the process of filling molds with liquid sterling silver alloy to reveal the intricate and complex shapes and designs that make up each mold.

The "Apecs sterling silver alloy" has been responsible for increasing the sales of our sterling silver alloys by almost 250% since 1994. As can be seen in our Exhibits G & H, United Precious Metal sold about 400,000 troy ounces of sterling silver alloy in 1994, and only five years later, United Precious Metal sold nearly one million troy ounces of sterling silver alloy in 1999. The "Apecs sterling silver alloy" currently accounts for nearly 65% of United Precious Metal's total sterling silver alloy sales, accounting for sales of 636,521 troy ounces of "Apecs sterling silver alloy" in 1999. Further, United Precious Metal's annual sales of "Apecs sterling silver alloy" was 610,641 troy ounces in 1998, 495,837 troy ounces in 1997, 423,442 troy ounces in 1996, 242,250 troy ounces in 1995 and 160,043 troy ounces in 1994, as also shown in Exhibit G. In another perspective, United Precious Metal

has sold 5.77 million troy ounces of sterling silver since 1990. The "Apecs sterling silver alloy" comprises nearly half (2.63 million troy ounces) of all sterling sold by United Precious Metal since 1990, even though the "Apecs sterling silver alloy" has only been sold since 1994.

The "Apecs sterling silver alloy" became the preferred metal of choice of United Precious Metal customers, soon after its introduction to the market in late 1994. The "Apecs sterling silver alloy" is more expensive than our other sterling silver alloys, costing at least 25 cents more per troy ounce, yet still has remained our biggest selling alloy over the other sterling silver alloys sold by United Precious Metal. An increase of 25 cents per troy ounce is significant in the sterling silver alloy market because sterling silver alloy is seen as a commodity raw material, sold for $6.00 or less per troy ounce. An increase of only a few cents and ounce, could price a particular alloy right out of market. Customers have stated that characteristics such as superior fire scale resistance, increased work hardenability over other fire scale resistant silver alloys, as well as the lengthened fluidity range exhibited by the "Apecs sterling silver alloy", are reasons why they chose the more expensive "Apecs sterling silver alloy" over our other alloys. These characteristics were particularly sought after by manufactures of cast jewelry that contains intricate or complex shapes and designs.

I am familiar with the silver copper germanium alloys taught by Rateau et at. in GB 2,255,348. Rateau teaches only silver copper alloys incorporating large concentrations of germanium in order to achieve their desired results. It is well known that germanium is an expensive element. The amount of germanium needed to produce a viable commercial silver copper germanium product, according to the teaching of Rateau, would increase the cost of the product by 20-30% over traditional commercial silver copper alloys. In my opinion, bases on my 25 years experience selling and manufacturing silver copper alloys, this dramatic cost increase of the silver copper germanium alloys taught by Rateau, would negate any real commercial value of the alloy.

No increase in advertising was conducted for the "Apecs sterling silver alloy" over the other silver alloys sold by United Precious Metal. To the best of my knowledge, the "Apecs sterling silver alloy" was marketed in the normal way we introduce any new alloy, by advertising it only in our product brochures alongside our other high silver content silver copper alloys. For example, there was one color ad in a national magazine that ran periodically, advertising the "Apecs sterling silver alloy". We did the same advertising with our earlier sterling silver alloys.

In my opinion, bases on the information provided above, the commercial success of the "Apecs sterling silver alloy" is due to characteristics exhibited by the "Apecs sterling silver alloy" not duplicated by any other alloy known to me. The commercial success enjoyed by the "Apecs sterling silver alloy" is an indication and should have relevancy as

evidence, that the combination of elements in this "Apecs sterling silver alloy" composition claimed in the present application is non-obvious.

Melvin Bernhard

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC 1001, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Melvin Bernhard

SMK/pam